

09/296,588
YO998-532

REMARKS

The undersigned personally thanks the Examiner for the productive and courteous telephone interview which prompted many of the foregoing claim amendments. As discussed during the interview, it is Applicants' position that all rejections are overcome with the foregoing claim amendments.

Claims 1-20 are all the claims pending in the application. Claims 1, 8, and 15 stand rejected upon informalities and claims 1-20 stand rejected on prior art grounds. Applicants respectfully traverse these rejections based on the following discussion.

I. The 35 U.S.C. §112, Second Paragraph, Rejection

Claims 1, 8, and 15 stand rejected under 35 U.S.C. §112, second paragraph. In response thereto, claims 1, 8, and 15 have been amended two more specifically define the level of conductivity of the amorphous film. As explained on page 18, lines 18-19 of the application, the resistivity of the amorphous film is between 104 and 1011 ohm-cm. Applicants respectfully submit that this resolves any ambiguity regarding the conductivity of the amorphous layer. In view the foregoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

II. The Prior Art Rejections

A. The Rejection Based on Yasukawa

Yasukawa does not teach or suggest the use of a diamond-like conductive film adjacent one or both of the electrodes in a reflective LCD device, as in the claimed invention. To the contrary, Yasukawa requires that an insulator (silicon oxide) be positioned as a passivating layer next to the electrodes. The Office Action argues that Yasukawa discloses the amorphous insulator 17 disclosed in Yasukawa teaches the "conducting amorphous layer" (claims 1 and 15) and "conducting amorphous diamond-like carbon layer" (claim 8).

09/296,588
YO998-532

Applicants agree that claim language should be interpreted broadly during examination; however, such an interpretation cannot reach the point of being so broad as to contradict the clear meaning of the term being interpreted. Here, the claims clearly define a "conducting" layer that "has a resistivity between 104 and 1011 ohms-cm". Silicon dioxide is an insulator, unless modified (as with carbon) so that it changes its insulating characteristics.

The Office Action urges that the silicon oxide insulator disclosed in Yasukawa should be considered a conductor because all materials have some level of conductivity, no matter how slight. Applicants respectfully disagree that silicon oxide should be classified as a conductor for a number of reasons, the first and foremost of which is that silicon oxide (and silicon dioxide) are categorized by those skilled in this art field as insulators. Silicon oxide is not used as a conductor. Further, Yasukawa uses the silicon dioxide layer 17 as an insulator and calls the layer a "passivating layer". Yasukawa uses silicon oxide to prevent significant change in reflectance due to the variation of film thickness and wavelength of light. Therefore, not only is the Office Action urging a meaning of silicon oxide that is contrary to the well-known meaning, it is also contrary to the meaning intended in the reference.

Further, the Office Action argues that silicon oxide has a "slight" amount of conductivity. However, this language is not included in the claims. To the contrary, the claims define a "conducting amorphous layer" (claims 1 and 15) and "conducting amorphous diamond-like carbon layer" (claim 8) each of which "has a resistivity between 104 and 1011 ohms-cm". The terminology "slightly conducting" is not used in the independent claims. Therefore, the position in the Office Action is additionally erroneous because it is reading limitations into the claims that are not there.

In addition, the Office Action proposes that since some of the dependent claims define the conducting amorphous layer as including ("comprising") silicon dioxide that silicon dioxide should be considered a conductor. But, Applicants submit that this logic is flawed because of the legal meaning of the word "comprising". More specifically, the dependent claims define that the amorphous layer can "comprise" a number of substances one of which is a silicon dioxide. This is legally interpreted to mean that one of the elements within the layer is silicon dioxide. This does not mean that the layer is

09/296,588
YO998-532

exclusively silicon dioxide. Instead, if Applicants had intended such a meaning, they would have used more restrictive language such as "consisting of" or "consisting essentially of". The paragraph appearing on page, lines 10-15, explains that the silicon dioxide layer is changed from an insulator into a conductor using a form of carbon.

As shown above, Applicants respectfully submit that in attempting to broadly interpret the claim language and the teachings of the prior art, that the Office Action has exceeded what is permitted. More specifically, classifying the passivating layer of silicon dioxide in Yasukawa as a conductor exceeds the boundaries permitted on broad interpretation. The claims clearly and unambiguously define a "conducting amorphous layer" (claims 1 and 15) and "conducting amorphous diamond-like carbon layer" (claim 8) each of which "has a resistivity between 104 and 1011 ohms-cm". To the contrary, Yasukawa discloses a passivating layer 17, nothing more. Therefore, Yasukawa does not teach or suggest the claimed invention.

As explained in column 16, lines 51-59 of Yasukawa, the prior art requires a passivating insulator 17. This requirement to use an insulator 17 teaches away from the claimed invention which uses a "conducting amorphous" layer adjacent at least one of the electrodes. Therefore, Yasukawa does not teach or suggest the invention as defined by independent claims 1, 8, or 15 and these independent claims are patentable over Yasukawa. Further, dependent claims 2, 5, 9, 12, 14, 16, and 19 are similarly patentable, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define. In view the forgoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

B. The Rejection Based on Yasukawa in view of Hanihara

Hanihara does not cure the deficiency of Yasukawa shown above. More specifically, Hanihara does not teach or suggest the conductive amorphous layer defined by independent claims 1, 8, and 15. Indeed, Hanihara is only referenced for showing that silicon oxide has a unidirectional orientation matched to the liquid crystal material and is not intended to teach or suggest a diamond-like conductive amorphous layer. Therefore, any combination of Hanihara and Yasukawa would not teach or suggest "a conducting

09/296,588
YO998-532

amorphous layer adjacent said liquid crystal material"; "a conducting amorphous diamond-like carbon layer adjacent said liquid crystal material"; or "forming a conducting amorphous layer on at least one of said first-type electrode and said second-type electrode adjacent said liquid crystal material," as defined by independent claims 1, 8, and 15, respectively.

Therefore, independent claims 1, 8, and 15 are patentable over any combination of Yasukawa and Hanihara. Further, dependent claims 4, 11, and 18 are similarly patentable, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

C. The Rejection Based on Yasukawa in view of Admitted Prior Art (Lu)

Neither Lu, Hanihara, nor Yasukawa teach or suggest the conductive amorphous layer defined by independent claims 1, 8, and 15. Lu teaches using the same material of one electrode (the transparent one) to cover the other to balance work function. Indeed, Lu and Yasukawa affirmatively teach away from the claimed invention by requiring a passivating insulator adjacent the electrodes. Lu teaches the use of a conducting layer to balance the work function. Due to this layer's high conductivity, an extra photolithographic step is required in Lu to avoid shorting the pixels together. Such processing is very difficult to achieve. As shown above, the claimed invention is fundamentally different than any of the teachings in the prior art. The invention avoids flicker LCD problems by using a conducting thin film, e.g., diamond-like carbon (DLC) film, coated on both the Al and ITO electrodes of reflective LCDs to reduce and stabilize the Vcom shift. The conducting film allows electrical charges to flow toward the electrodes and bend the Fermi level of the adjacent electrode and balance the surface potential. Thus, with the invention, the Vcom shift is small and stable so that the display can be operated in the frame-inversion drive with a frame rate lower than 70 Hz without perceivable flicker.

09/296,588
YO998-532

Such features are simply not taught or suggested by the prior art of record. More specifically, none of the applied references teaches or suggests "a conducting amorphous layer adjacent said liquid crystal material"; "a conducting amorphous diamond-like carbon layer adjacent said liquid crystal material"; and "forming a conducting amorphous layer on at least one of said first-type electrode and said second-type electrode adjacent said liquid crystal material," as defined by independent claims 1, 8, and 15, respectively.

Therefore, independent claims 1, 8, and 15 are patentable over any combination of Yasukawa and Lu. Further, dependent claims 6, 13, and 20 are similarly patentable, not only by virtue of their dependency from a patentable independent claim, but also by virtue of the additional features of the invention they define. In view of the forgoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

D. The Double Patenting Rejection

Lu affirmatively claims a "dielectric material" adjacent the reflective electrode (claim 6). As shown above this teaches away from the invention that uses a "conductive" amorphous layer adjacent at least one of the electrodes. Therefore, there is a substantial difference between the claimed invention in Lu and the present invention. More specifically, the present invention which claims "a conducting amorphous diamond-like layer adjacent said liquid crystal material"; "conducting amorphous carbon layer adjacent said liquid crystal material"; and "forming a diamond-like conducting amorphous layer on at least one of said first-type electrode and said second-type electrode adjacent said liquid crystal material," as defined by independent claims 1, 8, and 15, respectively, is patentably distinct (and patentable over) the invention defined by claims 6-13 of Lu. In view of the forgoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

09/296,588
YO998-532

III. Formal Matters and Conclusion

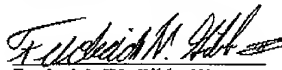
In view of the foregoing, Applicants submit that claims 1-20, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary.

Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 50-0510.

Respectfully submitted,

Dated: 5/22/03


Frederick W. Gibb, III
Reg. No. 37,629

McGinn & Gibb, PLLC
2568-A Riva Road
Suite 304
Annapolis, MD 21401
(301) 261-8071
Customer Number: 28211